NOTES IN THE PROVINCES.

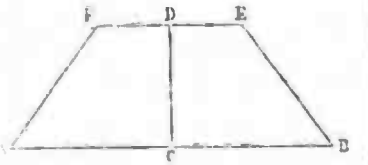
It has been determined to improve and enlarge the interior, and to restore the exterior of the ancient parish church at Worksop. At a meeting of the inhabitants, held last week, the Duke of Newcastle in the chair, Mr. R. Nicholson's plans, by which additional accommodation for 300 persons will be obtained, were adopted. The total expense is estimated at 900*l.* A subscription is to be opened forthwith.——The first stone of Galway Queen's College will be laid towards the close of next month. The site is Belmont, within about ten minutes' walk of the remotest district of the town; it is spoken of as being very salubrious, and highly picturesque. The edifice will be in the Gothic style, after the design of Mr. Keun.—The sum of 1,950*l.* has been subscribed towards rebuilding Trevethin church, for which plans and specifications are in course of preparation. It is intended to take down the old fabric, and on its site to erect the new church, which is to be finished by October.——A Gothic pulpit, of carved oak, from a design of Mr. Hutchinson, jun., has just been erected in St. James's church, Hull. It is octangular, supported by an open square pedestal. In the front compartment is a shield bearing the crest of the donor, the Rev. W. Knight, M.A., incumbent, supported by a pair of cherubim.—— A spacious school, in the early English style, and capable of accommodating 800 children, has been erected at the extreme end of Grafton-street, Tuxteth park. At the back of the main building two houses have been erected for the accommodation of the master and mistress. The whole of the building was contracted for by Mr. Parr, of Litherland, and will cost upwards of 2,300*l.*, which sum has already been collected, John Gladstone, Esq., of Fasque, who erected and endowed the church at his own expense, giving 600*l.*——A quarry of excellent marble has been discovered at Aberfoyle, on the estate of the Duke of Montrose, and near to the line of the Forth and Clyde Railway.——The Earl of Lonsdale has given a donation of 50*l.* in aid of the subscription for rebuilding the parish church of Aspatria, Cumberland; that ancient building being inadequate for the accommodation of the residents of that locality.——It is stated that there are nearly 100 building societies in Liverpool, and that their capital amounts to 240,000*l.*——The newly-erected Roman Catholic chapel, in St. John-street, Bridgwater, will be opened on Tuesday next. It is dedicated to St. Joseph.——At a special meeting of the Severn Commissioners, held last Saturday at Bristol, it was unanimously resolved to erect a new bridge at Upton, and to raise £30,000 to defray the cost of the same. Mr. Williams handed in the plans of the proposed structure. It is a "bascule," or perpendicular drawbridge; and in reference to this subject Lord Hatherton remarked that the people of Upton need not be under any apprehension, for that at Amsterdam and many other places on the continent the same kind of bridge was in use, and had not been found to offer any obstruction to the traffic. ——The Grammar-school Chapel, at Clapham, was opened on Saturday last by the Bishop of Winchester. It is built in the early English style of architecture, and contains seats for about 250 persons. Its dimensions are 50 ft. by 20 ft. wide, and 36 ft. high. Over the communion-table are three painted windows, which were presented to the chapel by the pupils of the grammar-school. The subject of the centre window is the Apostle John, the chapel itself being dedicated to that saint. There are painted windows also on each side of the chapel, representing Bishops Cranmer and Ridley.——The town of Glasgow was visited by a very destructive hurricane, accompanied by a heavy fall of rain, on Saturday last. A new tenement of three stories in height, situate in Cook-street, Gorbals, after rocking to and fro for some considerable time, fell and buried in its ruins a small one-story house that rested against its gable. The whole was converted into a mass of rubbish. Fortunately, there was sufficient warning of the impending danger, and the inmates escaped with their lives. About the same time, part of the roof and walls of the foundry belonging to Mr. Robertson, in Surrey-street, Gorbals, were blown down. In the same neighbourhood the extensive rope-works of Mr. Wales was demolished.

METHOD OF SETTING OUT A CANT GEOMETRICALLY.

At page 81 of THE BUILDER for the 14th current (February, 1846), a correspondent, who signs himself "J. C. W.," in a letter to the Editor, proposes as a problem for solution:—To set out a cant geometrically in such a manner, that the three sides of the projection shall be equal to each other, the base of the cant and its perpendicular breadth or central line being given:

The solution of this problem is a matter of the utmost simplicity, so much so indeed, that to any person but slightly acquainted with the elementary principles of geometry it must be self-evident; and the circumstance of its being proposed for solution in the pages of THE BUILDER furnishes another proof, if any such were wanted, how small a share of geometrical knowledge is possessed by the generality of practical men. If the problem had been proposed as a curiosity in science, or with the design to puzzle those who are prone to inquiries of this nature, it would have been altogether beneath the notice of the merest tyro; but since it has a direct reference to certain departments of constructive practice, it merits our attention on that account; and as the proposer is obviously seeking for practical information, the following solution is supplied for the purpose of meeting his views. Other and more elegant solutions might be given, such, for instance, as tracing the locus of an equation of the second degree; but as simplicity of operation is always to be preferred in practice, we consider the method here adopted as the best, and the most likely to be generally understood: Let ABEF, fig. 1, be the plan of the cant which the problem requires to be laid

Fig. 1

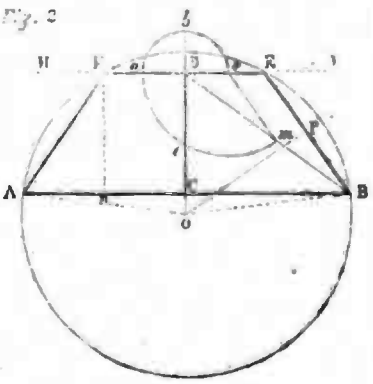


down; AB the base or opening of the projection; CD the central line or perpendicular breadth of the plan, and AF, FE, and BE the equal sides, of which FE is parallel to AB; AF and BE being similarly placed with regard to the parallel sides AB and FE.

Since AB is bisected in C, and FE in D, the plan is manifestly divided into two equal and symmetrical parts with regard to the central line CD, and because by the conditions of the problem the three sides, AF, FE, and BE are equal among themselves, it manifestly follows, that DF or DE is equal to one-half of AF or BE; and this, in reality, is the only circumstance that requires to be discovered to lead us directly to the solution of the problem. The geometrical construction is as follows:—

Draw the straight line AB (fig. 2) in any convenient direction at pleasure, which make

Fig. 2



equal to the given base of the cant or projection; bisect AB in C, and at C, the bisecting point, erect the perpendicular CD, which make equal to the given breadth or central line of the plan; and through the point D draw HI parallel to the base line AB, which will determine the direction of one side of the cant.

Draw the straight line BD to connect the given points B and D, and on D as a centre; with any distance Da taken at pleasure as a radius, describe the semi-circle *abc* meeting DI in the point *c*, so that Da and Dc are equal to one another; then, on *c* as a centre, with the distance *ca* as radius, describe the circular arc *aem* meeting BD in the point *m*; draw *mc*, and through the given point B, one extremity of the base line AB, draw BE parallel to *mc* meeting DI in E; then is BE one side of the required cant. Make DF equal to DE and draw AF, so shall AF and FE be the other two sides, and ABEF is consequently the cant or projection sought. Bisect BE in P, and at the point P erect the perpendicular PO to meet DC produced downwards in O; then is O the centre of the circle which circumscribes the figure sought, and passes through its angular points at A, B, E, and F.

Such, therefore, is the geometrical solution of the problem, and it is obvious that nothing can be more easily effected; but in order that the reader may have no misgivings as regards the correctness of the principles here adopted, we think proper to supply the following demonstration.

The distance Da is assumed at pleasure, and since Dc is equal to Da, *ca* is equal to twice Dc; but *cm* is equal to *ca*, the two being radii of the same circular arc *aem*; consequently, *cm* is equal to twice Dc. Now by the construction, BE is parallel to *mc*, therefore, in consequence of the parallelism of these lines, the triangles D*m*c and DBE are similar, and their homologous sides proportional; that is, DC is to *cm*, as DE to EB; but *cm* is equal to twice Dc, consequently EB is also equal to twice DE, and this is the condition that the problem requires to be satisfied; hence the truth of the construction is manifest.

What we have done above is all that the proposer requires, and however easy may be the process of delineation, or the determination of the sizes by the principles of geometry, it is otherwise with the algebraic and numerical solutions, and since it may be necessary in some instances to know the exact numerical value of the equal sides, as obtained from calculation and not from measurement, it strikes us that the solution of the problem will not be complete or satisfactory, unless the method of obtaining the sides by calculation be also exemplified, and for this purpose—

Let F*n* be drawn from the angle of the figure at F, perpendicular to the base line AB, and meeting it in the point *n*; then, since F*n* is parallel to DC, *n*C must be equal to FD; but FA by the question, is equal to twice FD, or twice *n*C; and consequently, FA squared, is equal to four times the square of *n*C. Now, $FA^2 = An^2 + Fn^2$ by the property of the right angled triangle; hence we have, $An^2 + Fn^2 = 4Cn^2$; but, by subtraction, $Cn = CA - An$, where *An* is unknown; therefore it is, $An^2 + Fn^2 = 4(CA - An)^2$; and this, by expansion and transposition, becomes $3An^2 - 8CA\,An = Fn^2 - 4CA^2$, which is an affected quadratic equation, involving *An* as the quantity to be determined; and if this equation be reduced by the rules appropriated for that purpose, we shall obtain

$$An = \tfrac{1}{3}\left\{4CA \pm \sqrt{3Fn^2 + 4CA^2}\right\},$$

a result in which the negative sign only can be employed, the positive one being inconsistent with the conditions of the problem. The following is the rule in words for reducing this equation:—

RULE.—To three times the square of the perpendicular breadth, or central line of the projection, add four times the square of the semi-base; then, from four times the semi-base, subtract the square root of the sum, and take one-third of the remainder for the quantity sought. From the semi-base subtract the quantity thus found, and twice the remainder will be the side of the cant required.

Example.—Suppose the base of the projection to be 40 feet, and the perpendicular breadth or central line 15 feet, and let it be required to determine the side of the cant.

Here by the rule we have $15 \times 15 \times 3 = 675$
$20 \times 20 \times 4 = 1600$
Sum $= 2275$